

Challenges

Food safety for the consumer and occupational health risks for aquaculture producers, especially those working in wastewater-fed systems, affect the future potential of growing fish and aquatic vegetables in cities. Deteriorating water quality and increased agrochemical use in order to boost production, have resulted in governments and consumers being increasingly concerned with the quality, food hygiene and safety of aquatic products.

Consumers should be provided information on the quality of wastewater-fed fish and aquatic plants (including overcoming misperceptions on the levels of contamination). Research is therefore needed to assess actual relative and absolute health risks from both producers' and consumers' perspectives. A risk assessment based approach as recommended by the World Health Organisation (WHO), should be applied to mitigate food safety, occupational hazards and other risks.

Risks could also be reduced by promoting low-risk production systems, such as ornamental fish and plants, in specific areas or production conditions. Health risk reduction measures should however not only focus on improving water quality and production practices (see further Brief 5), but also ensure transport and market hygiene and avoid post-harvest contamination.

Improving public health and food safety

Health benefits

The contribution of urban aquaculture to food security and healthy nutrition is one of its most important assets. For example peri-urban fish plays an important role in providing a cheap source of protein, especially to lower-income urban consumers. By producing food in the city, urban producers can also reduce household food expenses and generate additional income.



Potential health risks

As a result of increasing contamination of water sources and use of pesticides however, also potential health risks may occur. For example, levels of protozoan parasites found on water spinach produced using wastewater in Phnom Penh (Cambodia), although low, might constitute a food safety risk. Skin problems seem to be the main occupational health risk for those working with wastewater. Although treatable, their possible long-term, chronic, effects are not known.



Action research to improve public health and food safety

Feeding and employing the urban population is a challenge that cities have the responsibility to meet. Gradually awareness among city authorities, health and food safety institutes and other organisations is growing that actual policies should be revised and interventions designed in order to make better use of the potentials of urban aquaculture while preventing and reducing the risks associated with it.



Improving public health and food safety

1 Research needed to assess actual health risks

Recent studies in Phnom Penh (Cambodia) and Hanoi (Vietnam) indicate a number of health-related impacts of urban aquaculture, with skin infections being the most prominent. Plants and fish grown in wastewater do show various levels of faecal contamination, with presence of pathogens like protozoan parasites. Non-wastewater fed produce however, shows similar levels of faecal contamination taking place post-harvest during transportation and handling at markets. Studies on fish-borne zoonotic parasites show low and similar levels in wastewater-fed and non-wastewater fed fish. Lastly, both fish and plants prove to contain very low concentrations of toxic elements such as arsenic, cadmium and lead, which however in most cases are within FAO/WHO guidelines for safe human consumption. Similar and further research is needed in these and other cities, to assess the actual health risks of wastewater and non wastewater fed aquaculture, as well as the feasibility of risk-reduction methods. Further analyses are also needed to assess the relative importance of contamination during production compared with contamination taking place further down the food chain, in particular at the market level (see also Brief 3).

2 Set and monitor water and product quality standards

Integral to this type of research, water and product quality standards should be set, monitored and regulated. The revised WHO guidelines for wastewater quality for example now include health-based targets and could be used for defining and control of food safety standards. Product quality could be linked to options for certifying and selling “safe” crops/species at a higher price. It is also necessary to coordinate actions with municipal or national laboratories, or to enter into agreements with universities or private agencies for controlling and monitoring the microbiological and chemical quality of the wastewater-fed fish and plants. In China for example, the government is developing a movement for safe, healthy food production that includes a system of licensing and inspection.

3 Adapting farming systems to production conditions

In case of wastewater fed systems, it is also important to take into account the quality of wastewater available for production when selecting the appropriate production system. Food fish farmers, facing increasing pollution and food safety problems, can for example switch to ornamental fish production, as they do in Bangkok (Thailand) and Ho Chi Minh City (Vietnam). Other producers in Ho Chi Minh City have begun cultivating ornamental (house) plants for the growing market of urban consumers. This is a safe means of maintaining/creating further employment by developing the already available skill base and expertise in aquatic production systems, whilst also strengthening a market and export industry bringing in cash. A combination of, for example, crop restrictions and tax incentives for certain production systems (see also Brief 5) could be applied.

4 Ensuring market hygiene

Apart from ensuring food safety in production, sanitary conditions at markets should be improved and producers and vendors educated on hygienic processing (see also Brief 3). It is necessary to set out operating rules, such as access to clean water and sanitation, waste management, personal hygiene, and the provision of adequate marketing equipment.



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